

REMARKS

Claims 1-12 and 14 are pending in this application. Claim 13 has been canceled and claim 14 has been newly added. Reconsideration of the rejections in view of these amendments and the following remarks is respectfully requested.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment, which is captioned "Version with Markings to Show Changes Made."

Specification

The abstract has been objected to because it is allegedly overly lengthy; the title of the invention has been objected to because it allegedly is not descriptive; and the disclosure is objected to because of various informalities.

As to the Examiner's outstanding objection to the Abstract of the Disclosure, as indicated above, the Applicant has canceled the current Abstract, and submits herewith a substitute Abstract of the Disclosure in place therefor.

Applicant respectfully submits that the amendments overcome the objection to the specification. Accordingly, the objection to the specification should be withdrawn.

Rejections under 35 USC §112, Second Paragraph

Claims 1, 3, 7, 10, 11 and 13 are rejected under 35 USC §112, second paragraph, as being indefinite because of informalities.

The claims have been amended to correct informalities and distinctly claim the subject matter. It is believed that this Amendment is fully responsive to the Office Action.

Rejections under 35 USC §102(b)

Claims 1-4, 6-7 and 9-13 are rejected under 35 USC §102(b) as being anticipated by Ishida et al (U.S. Patent No. 5,932,012).

Claim 1 has been amended to recite the steps of “forming a two-dimensional paste pattern on a first joining surface of paste-applied body with a drawn paste line;” and “placing on the paste pattern a second joining surface of a chip member to be bonded.”

Ishida et al discloses a paste applicator for drawing a paste film in a desired pattern. Ishida et al describes the objects as follows:

An object of the present invention is to solve the above problem and to provide a paste applicator capable of **drawing a paste pattern accurately** at a desired position on a substrate even if a positional displacement of a nozzle discharging port to the substrate occurs due to nozzle exchange.

Another object of the present invention is to provide a paste applicator capable of **setting the relative positional relationship** between the nozzle discharging port and a substrate **accurately** and automatically when a positional displacement of a nozzle discharging port to the substrate occurs due to nozzle exchange.

Column 1, lines 56-67. Thus, Ishida et al focuses on the step of drawing a paste pattern. Ishida et al does not teach or suggest, among other things, the steps of “placing on the paste pattern a second joining surface of a chip member to be bonded.”

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For at least these reasons, claim 1 patentably distinguish over Ishida et al. Claims 2-4, 6-7 and 9-13, directly or indirectly dependent from claim 1, also patentably distinguish over the cited reference.

Claims 1-4, 6, 8, 10 and 11 are rejected under 35 USC §102(b) as being anticipated by Shimizu (U.S. Patent No. 4,824,006).

Shimizu discloses a die bonding apparatus which is suitable for use especially in die bonding of an elongated pellet to package. To achieve the object, Shimizu discloses an apparatus comprising paste supply means having a needle for supplying paste onto a package to secure a semiconductor pellet, driving means for moving the paste supply means in the directions of X, Y and Z, respectively, follow up means movable up and down **for causing the tip of the needle to follow the contour of the paste application surface** of the package, and support means for supporting the paste supply means through the follow up means (column 1, lines 29-44).

Thus, Shimizu merely discusses the uniformity of paste application width and thickness, but it does not teach or suggest, among other things, “forming a **two-dimensional paste pattern** on a first joining surface of paste-applied body with a drawn paste line.”

For at least these reasons, claim 1 patentably distinguishes over Shimizu. Claims 2-4, 6, 8, 10 and 11, directly or indirectly dependent from claim 1, also patentably distinguish over the cited reference.

Rejections under 35 USC §103(a)

Claim 8 is rejected under 35 U.S.C. §103(a) as being obvious over Ishida et al in view of Kawabe et al (U.S. Patent No. 5,985,069).

Kawabe et al has been cited for allegedly disclosing a pattern of a figure including an enclosed shape. Kawabe et al, however, does not remedy the deficiencies discussed above. For at least these reasons, claim 8, depending from claim 1, patentably distinguishes over Ishida et al and Kawabe et al.

Claim 5 is rejected under 35 U.S.C. §103(a) as being obvious over Ishida et al in view of Shimizu.

The Examiner alleged that “Given the similarity of the overall methods, it would have been obvious . . . because of the expectation of achieving equivalent results due to the fact the X-Y-Z paste application processes are so similar.” The pattern drawing in Ishida et al, however, has nothing to do with the die bonding of Shimizu, and there is no suggestion or motivation of combining the teachings of the two references.

For at least these reasons, claim 5 patentably distinguishes over Ishida et al and Shimizu.

Claims 5 and 12-13 are rejected under 35 U.S.C. §103(a) as being obvious over Shimizu.

As already discussed above, claim 1 patentably distinguish over Shimizu. Claims 5, 12 and 13, directly or indirectly dependent from claim 1, also patentably distinguish over the cited reference.

Claims 7 and 9 are rejected under 35 U.S.C. §103(a) as being obvious over Shimizu in view of Ishida et al.

As already mentioned above, the pattern drawing in Ishida et al has nothing to do with the die bonding of Shimizu, and there is no suggestion or motivation of combining the teachings of the two references. For at least these reasons, claims 7 and 9 patentably distinguish over the two references.

New Claim

New claim 14 has been added, which recites substantially same steps except that the recitations are not limited to “bonding.”

In view of the aforementioned amendments and accompanying remarks, claims, as amended, are in condition for allowance, which action, at an early date, is requested.

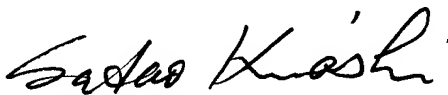
If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicant's undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

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In the event that this paper is not timely filed, Applicant respectfully petitions for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

ARMSTRONG, WESTERMAN & HATTORI, LLP



Sadao Kinashi
Attorney for Applicants
Reg. No. 48,075

SK/fs

Atty. Docket No. **010620**
Suite 1000, 1725 K Street, N.W.
Washington, D.C. 20006
(202) 659-2930



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PATENT TRADEMARK OFFICE

Enclosures: Version with Markings to Show Changes Made
Substitute Abstract of the Disclosure

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IN THE TITLE:

The title of the invention has been amended.

IN THE SPECIFICATION:

The paragraph beginning at page 6, line 12 has been amended as follows:

The drawing pattern may be a figure including the enclosed form. In the drawing pattern made up of a plurality of line segments, at least one of the line segments is preferably formed of two drawn lines. These two drawn lines are preferably formed by drawing a line ~~to go and return over a certain stroke segment with a first path in one direction and a second path in the opposite direction tracing the first path.~~ Specifically, at least one line segment is formed by moving a nozzle, a paste-applied body, or a paste in such a manner as to go and return over a predetermined distance. By so forming a plurality of line segments, one drawing pattern, i.e., one figure, can be obtained. In such a case, one line segment can be drawn to extend from one start point to one end point, or a plurality of line segments can be drawn to extend from one start point to one end point. ~~In other words, one drawing pattern is formed such that the total number of the start and end points of the drawn lines is not larger than the number of the line segments.~~ Preferably, the drawing pattern is formed while the start and end points of the drawn lines are kept from being positioned other than the end points. By forming the drawing pattern so that the start and end points of the drawn lines are positioned other than the end points of a figure of the applied adhesive, the start and end points of the drawn paste lines are positioned near the center of the figure. Therefore, when a uniform

force is pressed against the semiconductor chip placed on the applied adhesive, the adhesive is forced to very uniformly spread outward and no bubble is entrapped on that occasion. Also, the drawing pattern is preferably formed with a minimum number of ~~folds of the drawn lines~~ corners.

The paragraph beginning at page 13, line 1 has been amended as follows:

Looking at the paste from a side, which has been applied as described above, from one side of the lead frame, the paste appears as shown in Fig. 4(A). In practice, a central portion of the applied paste is slightly higher than a peripheral portion of the applied paste due to the presence of the extra paste.

IN THE CLAIMS:

Claims 13 has been canceled.

Claim 14 has been newly added.

Claims 1-3, 6-8, 10 and 11 have been amended as follows:

1. (Amended) ~~A paste pattern forming method wherein a drawing pattern is formed~~ A method of applying a paste on a paste-applied body, comprising the steps of:
forming a two-dimensional paste pattern on a first joining surface of paste-applied body with a linearly drawn paste line; and
placing on the paste pattern a second joining surface of a chip member to be bonded, such that

wherein no bubbles are left in the first and second joining surfaces when the first and second joining surfaces are bonded to each other.

2. (Amended) A paste pattern forming method according to Claim 1, wherein said ~~drawing~~ pattern paste line is linearly drawn with a paste on said ~~paste-applied body~~ by using a nozzle, the paste, a paste reserving container, and paste supply means.

3. (Amended) A paste pattern forming method according to Claim ~~1~~ or 2, wherein said paste is continuously discharged from said nozzle while the paste line is being drawn.

6. (Amended) A paste pattern forming method according to claim 1 or 2, wherein said ~~drawing~~ pattern is a figure made up of a plurality of segment lines.

7. (Amended) A paste pattern forming method according to Claim 6, wherein said ~~drawing~~ pattern is a figure in ~~the~~ a radial form.

8. (Amended) A paste pattern forming method according to claim 1 or 2, wherein said ~~drawing~~ pattern is a figure including an enclosed shape.

10. (Amended) A paste pattern forming method according to Claim 9, wherein at least one segment line is formed while moving any of said paste-applied body, said nozzle and said paste to go and return traveling in two paths, of which a first path is in one direction and a second path is in the opposite direction tracing the first path.

11. (Amended) A paste pattern forming method according to claim ~~1~~ or ~~2~~ 10, wherein said (drawing) pattern is formed such that the total number of start and end points of drawn lines is not larger than the number of segment lines starting point coincides with end point of drawing said line segment.

with start

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